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SCOTT R. COX
LYNCH, COX, GILMAN & MAHAN, P.S.C.
500 WEST JEFFERSON STREET
SUITE 2100
LOUISVILLE, KY 40202

EXAMINER	
NGUYEN, CAM N	
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte VLADIMIR FRIDMAN and ANDRZEJ ROKICKI

Appeal 2008-002271
Application 10/680,544
Technology Center 1700

Decided:[1] July 14, 2009

Before BRADLEY R. GARRIS, CHARLES F. WARREN, and TERRY J. OWENS, *Administrative Patent Judges*.

GARRIS, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from the Examiner's decision rejecting claims 1-8, 10-13, 15-20, 24, 27, and 28. We have

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[1] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the Decided Date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

jurisdiction under 35 U.S.C. § 6.

We AFFIRM.

Statement of the Case

Appellants characterize their invention as follows:

> The present invention relates to a catalyst for stationary and/or fluid bed dehydrogenation processes for hydrocarbons, which is particularly useful in vapor phase dehydrogenation. The catalyst comprises a chromium oxide on alumina catalyst, with at least two promoters including at least zirconium and magnesium, and preferably, an alkali metal. The resultant catalyst exhibits higher selectivity after aging than prior art catalysts.

(Spec. 1, ll. 8-15).

Representative independent claims 1 and 13 are reproduced below:

1. A catalyst for use in stationary or fluid bed dehydrogenation processes for converting hydrocarbons to olefins and/or diolefins, said catalyst consisting essentially of:

> a carrier; chromium, as a promoter, in the form of Cr_2O_3, at a concentration from about 10 wt% to about 30 wt%, based on the total catalyst weight; zirconium, as a promoter, in the form of ZrO_2, at a concentration from about 0.1 wt% to about 15 wt% zirconium, based on the total catalyst weight; and magnesium, as a promoter, in the form of MgO, at a concentration from about 0.1 wt% to about 15 wt% magnesium, based on the total catalyst weight.

13. A catalyst for use in stationary or fluid bed dehydrogenation processes for converting hydrocarbons to olefins and/or diolefins, said catalyst consisting essentially of:

> a carrier; chromium, as a promoter, in the form of Cr_2O_3, at a concentration from about 10 wt% to about 30 wt%, based on the total catalyst weight; zirconium, as a

> promoter, in the form of ZrO_2, at a concentration from about 0.1 wt% to about 15 wt% zirconium, based on the total catalyst weight; magnesium, as a promoter, in the form of MgO, at a concentration from about 0.1 wt% to about 15 wt% magnesium, based on the total catalyst weight and from about 0.3 to about 2 wt%, based on the total catalyst weight, of an alkali metal promoter, selected from the group consisting of sodium, potassium and mixtures thereof, expressed in the form of sodium oxide and potassium oxide.

The following references are relied upon by the Examiner as evidence of obviousness:

Hamner	4,212,771	Jul. 15, 1980
Kerby	5,258,567	Nov. 02, 1993
Zimmermann	5,378,350	Jan. 03, 1995

The Examiner rejects claims 1, 2, 5-8, 10-13, and 28 under 35 U.S.C. § 103(a) as being unpatentable over Zimmermann in view of Kerby and correspondingly rejects claims 3, 4, 15-20, 24, and 27 as being unpatentable over these references and further in view of Hamner.

The Examiner's fundamental position is that

> [i]t would have been *prima facie obvious* to one of ordinary skill in the art at the time the invention was made to have added magnesium to the catalyst of Zimmermann in order to achieve an improved catalyst having promoted activities because it is known as useful catalyst promoter (or modifier), as evidenced by Kerby (see Kerby at col. 12, claims 12-14)

(Ans. 5).

Issue

Have Appellants shown error in the Examiner's determination that it would have been obvious to provide the catalyst of Zimmermann with a

magnesium promoter and that the so-modified catalyst corresponds to the catalyst defined by representative claims 1 and 13?

Findings of Fact

It is undisputed that Zimmermann discloses a dehydrogenation catalyst comprising a carrier, chromium oxide, zirconium oxide, and at least one alkali and/or alkaline earth promoter (abstract, para. bridging cols. 1-2, col. 2, ll. 13-29, Exs. 1-2 in col. 4). Although Zimmermann lists several alkali or alkaline earth compounds including sodium and potassium compounds as suitable promoters, cesium compounds are described as outstanding promoters (col. 2, ll. 13-18). This is because "cesium compounds, in comparison with the other alkalis and alkaline earths, prevent the coke formation most effectively" (col. 6, ll. 50-52). Zimmermann implicitly discloses, and we expressly find, that cesium as well as sodium and potassium are alkali metals.

As stated above, Zimmermann's catalyst may contain compounds of alkaline earth metals. On this record, it is undisputed that magnesium is an alkaline earth metal. However, Zimmermann does not disclose magnesium compounds specifically as a catalyst promoter.

There is no dispute that Kerby also discloses a dehydrogenation catalyst comprising an active metal (e.g., Pt), a first modifier metal (i.e., Sn and/or Ga), and a second modifier metal selected from the group consisting of alkali metals (e.g., Na), alkaline earth metals (e.g., Mg), and rare earth metals (abstract, col. 2, ll. 10-25, claims 1, 2, 12-14).

Principles of Law

The claim phrase "consisting essentially of" signals that the invention necessarily includes the listed ingredients and is open to unlisted ingredients

that do not materially affect the basic and novel properties of the invention. *PPG Indus. v. Guardian Indus. Co.*, 156 F.3d 1351, 1354 (Fed. Cir. 1998). An applicant has the burden of showing that "consisting essentially of" excludes unlisted ingredients of the prior art (i.e., that such prior art ingredients would effect the basic and novel characteristics of the claimed invention). *In re Herz*, 537 F.2d 549, 551-52 (CCPA 1976); *In re De Lajarte*, 337 F.2d 870, 873-74 (CCPA 1964).

In assessing the obviousness of a claim to a combination of prior art elements, the question to be asked is whether the improvement is more than the predictable use of prior art elements according to their established functions. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007).

The prior art disclosure of a multitude of effective combinations does not render any particular formation less obvious, especially when the claimed composition is used for the identical purpose taught by the prior art. *Merck & Co. v. Biocraft Labs., Inc*, 874 F.2d 804, 807 (Fed. Cir. 1989).

In a § 103 inquiry, the fact that a specific embodiment is taught to be preferred is not controlling, since all disclosures of the prior art, including unpreferred embodiments must be considered. *Id.* Thus, a known or obvious composition does not become patentable simply because it has been described in the prior art as somewhat inferior to some other product for the same use. *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). Such a prior art description would not discourage following the path set out in the prior art or taken by an applicant and therefore would not teach away from an applicant's claimed invention. *Id. See also In re Geisler*, 116 F.3d 1465, 1471 (Fed. Cir. 1997).

Analysis

In light of Appellants' claim groupings, the appealed claims will stand or fall with separately argued claims 1 and 13 (App. Br. 11, 26, 28-31).

We begin by addressing Appellants' viewpoint that the "consisting essentially of" language of the appealed claims excludes the preferred ingredients of the prior art references such as the cesium compounds of Zimmermann. The Examiner has required Appellants to prove that such prior art ingredients are excluded by the claim language. In response, Appellants state that "[p]roof of this fact is inherent from the disclosure of Zimmermann . . . and Kerby" (App. Br. para. bridging 24-25). For example, Appellants contend that the appealed claims exclude Zimmermann's cesium compounds because "[u]pon reviewing all alkali and alkaline earth metals, presumably including magnesium, Zimmermann . . . concluded that the preferred promoter was cesium" (*id.*).

Appellants' contention is without persuasive merit. This is because the contention is based on the erroneous proposition that "consisting essentially of" excludes ingredients which are taught to be preferred or required for the inventions of the prior art. Instead, this claim language excludes only ingredients which materially affect the basic and novel properties of the invention claimed by Appellants.

Therefore, Appellants have failed to carry their burden of showing that the "consisting essentially of" language excludes from the appealed claims prior art ingredients such as the cesium compounds of Zimmermann. Indeed, based on the record before us, we do not perceive how Appellants would be able to show that cesium would materially affect the basic and novel properties of their invention. This is because, as stated earlier, cesium

is an alkali metal and Appellants' invention is explicitly disclosed as relating to a dehydrogenation catalyst which "comprises a chromium oxide on alumina catalyst, with at least two promoters including at least zirconium and magnesium, and preferably, an alkali metal" (Spec. 1, ll. 11-14) (emphasis added).

Appellants also argue that "no person skilled in the art reviewing the teachings of Kerby . . . with those of Zimmermann . . . would have been motivated to add magnesium, as a promoter, to a catalyst already containing alumina with chromium and zirconium as promoters" (App. Br. para. bridging 20-21; *see also* Reply Br. 14). In this regard, Appellants contend that Zimmermann's preference for cesium in comparison with other alkalis and alkaline earths "teaches away from the addition of a specific element that is essential to the applicants' invention[,] i.e. magnesium" (App. Br. 22, underlining deleted; *see also* Reply Br. para. bridging 11-12).

Appellants' arguments are unconvincing for a number of reasons.

First, Zimmermann's preference for cesium in comparison with alkaline earth metals does not somehow teach away from the use of alkaline earth metals such as magnesium. To the contrary, Zimmermann explicitly teaches using alkaline earth metals as explained previously. Moreover, as also explained previously, the fact that the prior art teaches a preference is not controlling in a § 103 inquiry since all disclosures of the prior art, including unpreferred embodiments, must be considered. For these reasons, Appellants have failed to convince us that Zimmermann teaches away from using both cesium as well as alkaline earth metal compounds for making a dehydrogenation catalyst.

Second, we find no persuasive merit in the Appellants' argument that an artisan would not have been motivated to provide the dehydrogenation catalyst of Zimmermann with an alkaline earth metal promoter in the form of a magnesium promoter specifically in view of Kerby's teaching that it is known in the prior art to use magnesium promoters in dehydrogenation catalysts. On the record before us, the combination of Zimmermann's catalyst with Kerby's magnesium promoter would result in nothing more than the predictable use of prior art elements according to their established functions.

Under the circumstances recounted above, Appellants' arguments reveal no error in the Examiner's conclusion that the catalyst of claim 1 would have been obvious.

With regard to claim 13, Appellants additionally argue as follows:

> In addition, while it is true that Zimmerman, et al. disclose that sodium or potassium can be added to a dehydrogenation catalyst as a promoter, it is also clear that the teaching of Zimmerman, et al. is that cesium is preferred as the promoter over other alkali metals, such as sodium or potassium. Thus, Zimmerman, et al. teach away from the use of sodium or potassium as a promoter.

(App. Br. para. bridging 26-27).

This argument is unpersuasive for reasons analogous to those set forth above. Furthermore, our determination that Zimmermann does not "teach away from the use of sodium or potassium as a promoter" (*id.*) is reinforced by the fact that Zimmermann expressly discloses catalyst formulations which include potassium and sodium promoters (Zimmermann Exs. 1-2 in col. 4).

Conclusions of Law

Appellants have not shown error in the Examiner's determination that it would have been obvious to provide the catalyst of Zimmermann with a magnesium promoter and that the so-modified catalyst corresponds to the catalyst defined by representative claims 1 and 13.

Accordingly, we sustain each of the Examiner's above-noted § 103 rejections.

Order

The decision of the Examiner is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

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SCOTT R. COX
LYNCH, COX, GILMAN & MAHAN, P.S.C.
500 WEST JEFFERSON STREET
SUITE 2100
LOUISVILLE, KY 40202